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The AMERICAN JOURNAL of OPTOMETRY

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'TWAS THE DAY AFTER CHRISTMAS

'Twas the day after Christmas, and up at the Pole
St. Nick had returned from his gift giving role.
With spirits so merry and heart that was light
He thought of the presents he'd spread through the night.

"These doctors are clever," he chuckled with pride
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AMERICAN JOURNAL OF OPTOMETRY

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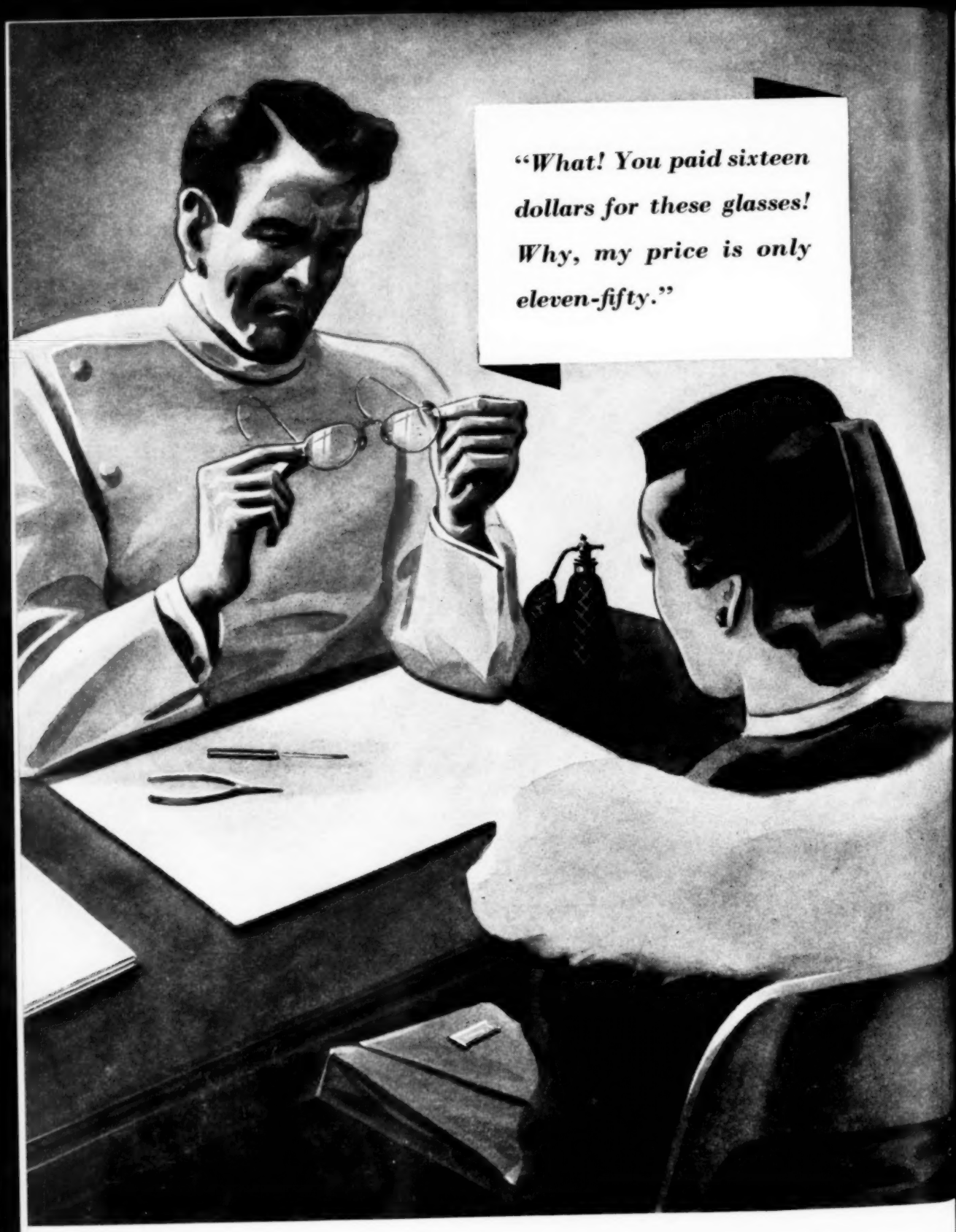
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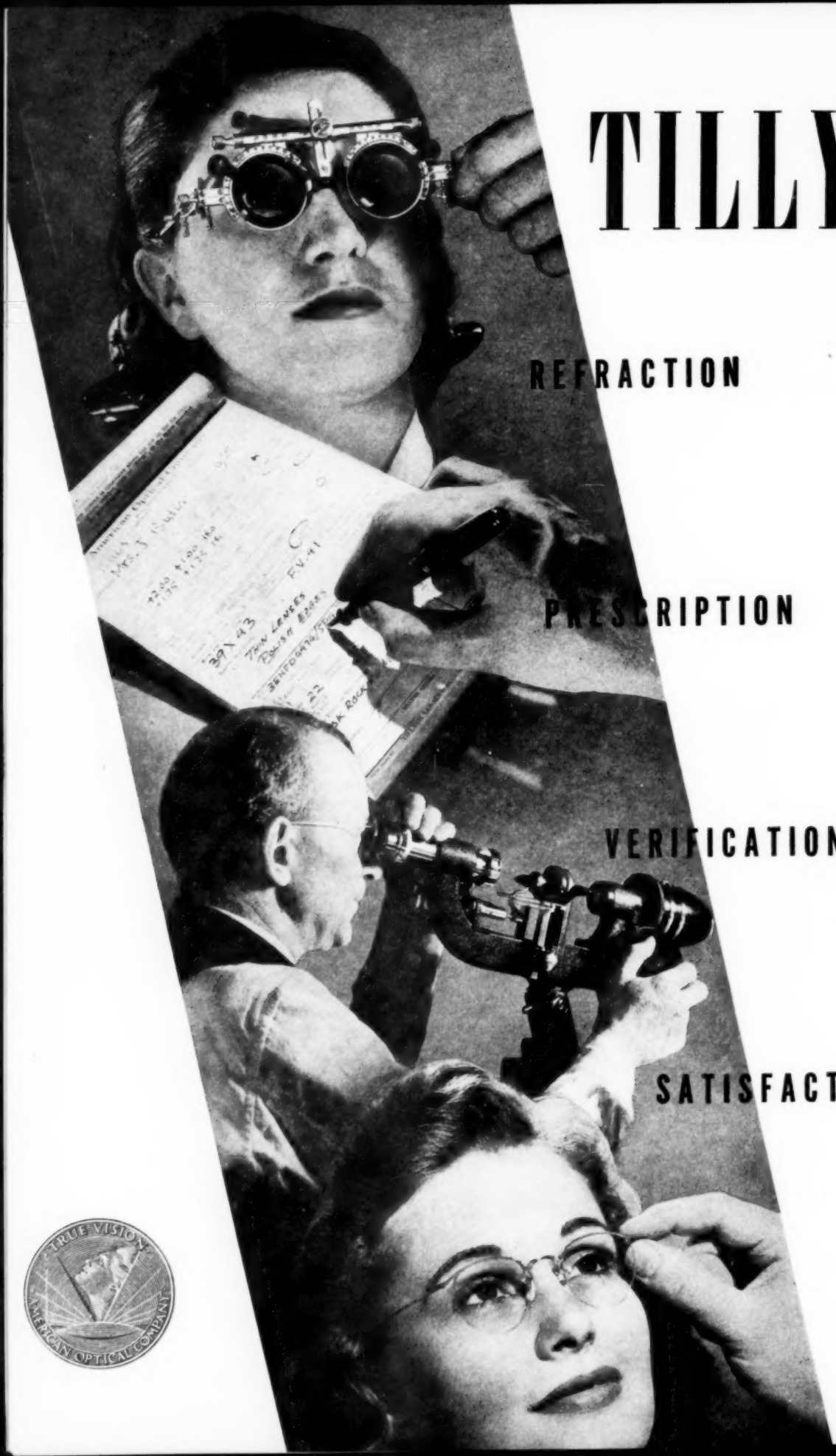
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To your earnest and sincere co-operation we owe our success,

Now we wish to extend to you our best wishes for a

Merry Christmas

and a

Happy New Year

The American Journal of Optometry

AMERICAN JOURNAL OF OPTOMETRY

Vol. 16 DECEMBER, 1939 No. 12

OCULAR CHANGES IN SCHOOL CHILDREN DURING THE FIFTH AND SIXTH GRADES*

Matthew Luckiesh and Frank K. Moss
Lighting Research Laboratory
General Electric Company
Nela Park, Cleveland

In 1936 there was inaugurated in an elementary school in Joplin, Missouri, a three-year investigation of the influence of modern school lighting upon the educational progress and physical welfare of pupils in the fifth and sixth grades. This research yielded a mass of optometric data of a unique character since all of the ocular examinations were made under standardized conditions, by the same examiner† and at the beginning and close of each school year. Furthermore, the same groups of pupils of almost identical ages were involved throughout the entire period of the investigation. These groups of pupils were carefully balanced with respect to chronological age, educational age, intelligence, visual ability, etc.

The ocular examinations involved the usual routine of 21 tests. However, in view of the number of possible correlations between all of these clinical findings and the variables of (1) classroom lighting and (2) increasing age of the subjects, the present discussion is limited to jective, static retinoscopic and dynamic retinoscopic tests. Furthermore, the analysis and discussion of the clinical data is also confined largely to the changes in spherical component of the indicated corrections.

The data presented herein were derived from four classes of about 25 pupils each during two consecutive years. Two of these classes remained throughout the test-period in the better-lighted experimental

*Submitted for publication October 9, 1939.
†Dr. C. W. Howard, Optometrist, Joplin, Mo.

rooms and the other two in the control rooms. One of these classes began the fifth grade in 1936 and completed the sixth grade in 1938, while the other began in 1937 and finished in 1939. The "staggering" of the two classes, with respect to time, obviously minimizes the possible influence of irrelevant factors. The experimental rooms were illuminated in conformity with recommended standards of school lighting, while the lighting in the control rooms was similar to that usually found in older schools. In both cases, the artificial lighting supplemented the natural lighting which was allowed to enter the rooms as usual. In general, the lighting in the experimental rooms was superior to that in the control rooms in three fundamental respects: (1) in level of illumination, (2) in maintenance of a given level of illumination during the day through automatic control of the artificial light and (3) in relative freedom from preventable glare. However, both types of rooms were equipped with modern school furniture and were decorated in an identical manner. Hence quantity of light and quality of the lighting were the only physical variables deliberately introduced in the investigation.

The Clinical Data. A qualitative analysis of the results obtained in the three optometric tests indicates that the refractive changes during the test-period are in the direction of less plus power in the greater number of cases, as will be observed from Table I. Since the typical subject of this age-group is hyperopic, the observed change in refraction is towards emmetropia. It will also be noted (bottom line of Table I) that these differentials are markedly greater in the better-lighted rooms (A-C) than in th control rooms (B-D). In fact, it appears that the general trend of the refractive changes is established largely by the pupils in the better-lighted rooms. This conclusion is indicated not only by the averages for the two classes in each lighting environment but also for the individual classes.

TABLE I

These data indicate the percentages of the pupils showing refractive changes of 1/4 diopter or more as summarized in various ways. These averages involve 103 subjects: 51 in the experimental rooms, A-C, and 52 in the control rooms, B-D.

	Subjective		Static Retinoscope		Dynamic Retinoscope	
	Room A-C	Room B-D	Room A-C	Room B-D	Room A-C	Room B-D
Both eyes same	15.7	17.3	5.9	15.4	5.9	9.6

Both eyes more +	9.8	23.1	9.8	11.5	19.6	28.9
Both eyes less +	37.3	32.7	47.0	26.9	39.2	32.7
One eye same, other more +	19.6	15.4	17.7	23.1	13.7	21.2
One eye same, other less +	13.7	7.7	13.7	13.5	11.8	3.8
One eye more +, other less +	3.9	3.8	5.9	9.6	9.8	3.8
One or both eyes more +	29.4	38.5	27.4	34.6	33.3	50.0
One or both eyes less +	51.0	40.4	60.8	40.4	51.0	36.5

The number of cases, expressed as a percentage, in which the refractive changes were in the direction of less plus power is shown in Fig. 1. In this diagram, the open and shaded blocks indicate the results obtained in the better-lighted and control rooms, respectively. It will be

FIG. 1

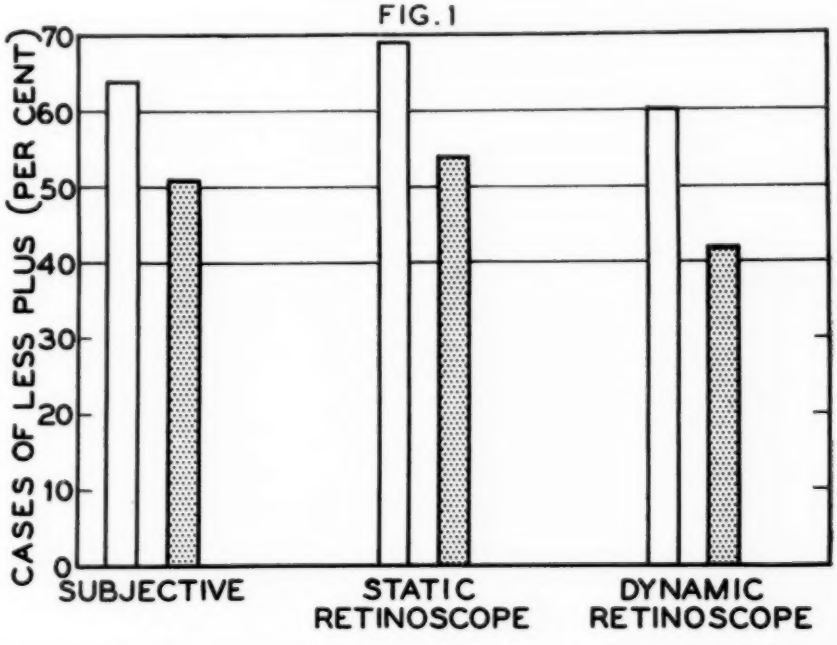

Fig. 1. The relative number of cases in the experimental rooms (open blocks) and in the control rooms (shaded blocks) in which the refractive changes from the beginning of the fifth grade to the close of the sixth grade were in the direction of less plus power.

noted that less plus power is indicated in approximately 65 per cent of the cases in the well-lighted rooms and in about 50 per cent of the cases in the control rooms. These general conclusions are based upon a consideration of the far-point tests. However, the general consistency of all three clinical tests supports the conclusion that the trends towards emmetropia are real and not due merely to accidental errors in the clinical measurements. This is evidence of the meticulous care with which the optometric measurements were made.

Quantitative analyses of the same clinical data are shown in Fig. 2 for each of the four examinations made during the two year test-period.

FIG. 2

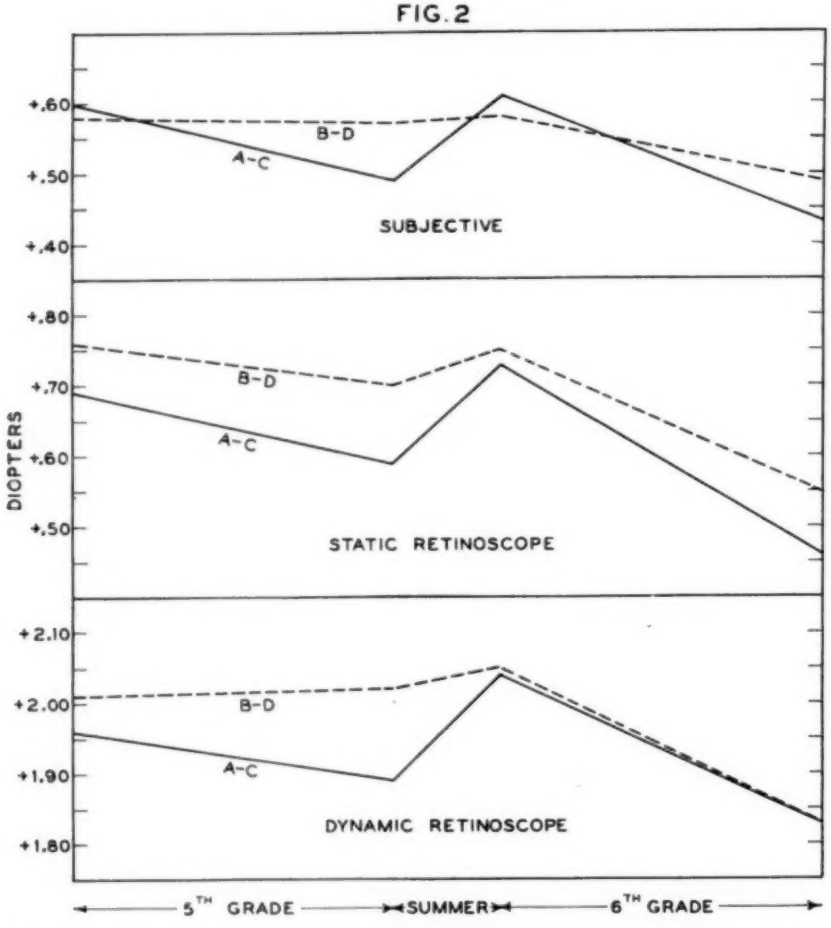

Fig. 2. The average spherical corrections for the pupils in the experimental and control rooms are indicated by the solid- and broken-lines, respectively.

In compiling these data, the spherical components of the corrections indicated by the clinical tests were averaged algebraically. If it be tentatively assumed that the refractive differentials (spherical components) shown in Fig. 2 are statistically significant, it appears that:

1. The direction of the refractive changes is the same when appraised by the subjective, static retinoscope and dynamic retinoscope methods.
2. The direction of the average refractive changes during the two school-years, respectively, is toward emmetropia.
3. The reduction in hyperopia is more marked in the sixth grade than it is in the fifth grade.
4. The refractive change occurring during the summer months is towards an increase in hyperopia: or opposite in direction to that occurring during the school year.
5. The reduction in hyperopia during the school-years is greater in the better-lighted room than in the control room. However, the refractive change occurring during the fifth grade is almost completely counteracted by the change during the summer. Unfortunately, data are not available for determining whether a similar result occurred during the summer following the sixth grade.

The average astigmatic corrections obtained in the four examinations are shown in Fig. 3. It will be noted that the indicated change from one examination to another is quite small and, in all probability, is not statistically significant.

Theoretical Considerations. It is of particular interest to note that the direction of the net refractive change (spherical component) occurring during the school year is opposite to the direction of that occurring during the summer vacation. Furthermore, both of these trends appear to be statistically reliable since (1) a decrease in hyperopia during the school year was observed in 10 of the 12 instances (the two exceptions being the fifth grade classes in the control rooms) and (2) an increase in hyperopia during the summer months was observed in 5 of the 6 instances (the exceptional case showing no marked change in either direction) as will be noted from Fig. 2. Furthermore, these general trends are consistently indicated, respectively, by the three methods of testing. If averages are considered, it appears that no significant decrement in

FIG. 3

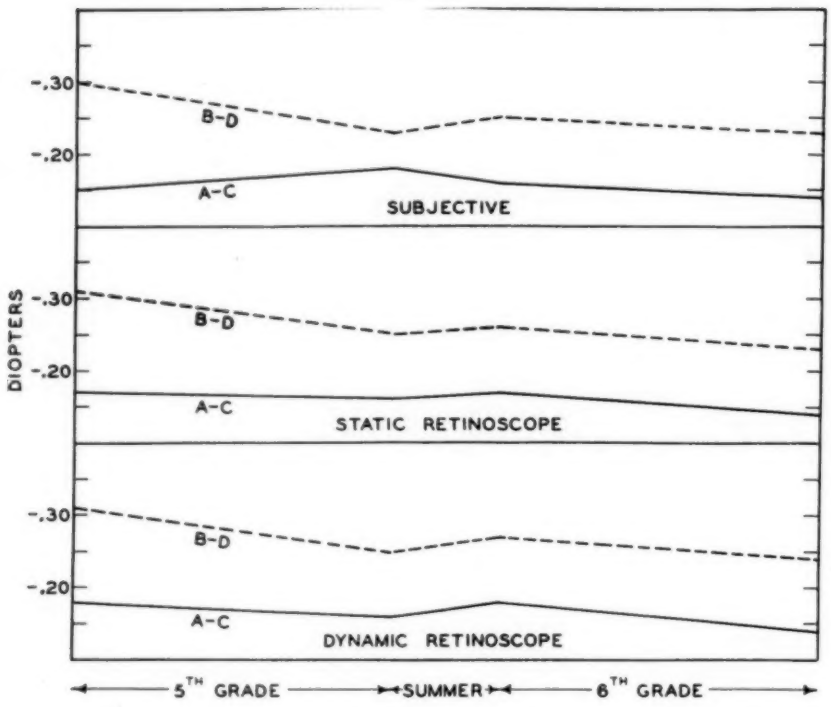

Fig. 3. The average astigmatic corrections for the pupils in the experimental and control rooms are indicated by the solid- and broken-lines, respectively. All of the astigmatic corrections were expressed in terms of minus lenses.

hyperopia occurred during the fifth grade while the decrement in the sixth grade was somewhat less than 1/4 of a diopter. However, it is emphasized that the latter datum represents the net change between two groups of subjects (see Table I) showing dissimilar refractive changes during the test-periods. Obviously, the average change for the group showng less plus power would exceed the differentials shown in Fig. 2. Since these subjects were handicapped by a hyperopic error of about 1/2 diopter, on the average, the compensation of a significant part of this error through mechanical or neural adaptation would seem to be important from the viewpoint of ocular hygiene.

It is possible that the opposing changes in refraction occurring during the school year and during the summer months, respectively, arise from either morphological or physiological causes. As one possible explanation, it might be assumed that the so-called "position of rest" of

the eyes gradually changes with the continued performance of near-point tasks. This is equivalent to stating that the degree of tonic accommodation is augmented by increasing the amount of near-work. Such an assumption is consistent with the empirically demonstrated fact that eyes of adult emmetropic subjects, in a state of physiological rest, are accommodated, in the average case, to the extent of about 3/4 of a diopter.[1] From this point of view, it will be noted that the accommodative changes occurring among the fifth and sixth grade pupils are in the same direction and not unreasonable in magnitude. If it is assumed that tonic accommodation is induced by near-work, it is also reasonable to assume that it may be relaxed to some extent during the summer months, as is empirically indicated. These considerations are also consistent with the fact that the refractive changes are greater in the sixth grade than in the fifth grade. This may be due to the increased prevalence and severity of near-work in the higher grade or to cumulative effects of near-work, or both.

It will also be noted from Fig. 2 that the lighting of the classrooms appears to be a factor which influences the indicated partial adaptation to near-vision. Although the general trend of the refractive changes in the sixth grade is similar in the experimental and control rooms, respectively, the changes are smaller for the pupils in the control rooms (B-D). On the other hand, the refractive trends during the fifth grade are dissimilar for the pupils in the two types of classrooms. It is recognized that there are present, in this experiment, so many uncontrolled variables that it is hazardous to definitely attribute certain refractive differentials to the factor of lighing. Nevertheless, such a correlation possesses considerable significance in view of the consistency of the experimental data.

In explanation of the refractive differentials found under the two lighting environments, it is conceivable that the higher degree of visibility resulting from better lighting stimulated the desire for clear seeing and, concomitantly, increased the stimulus to relative accommodation. As an analogy, it not infrequently happens that those who are able to achieve a high degree of visual acuity are least tolerant of any degree of imperfection in the functioning of the ocular mechanism. Furthermore, it is probably not an unrelated and insignificant fact that the pupils in the better-lighted rooms progressed "educationally" beyond those in the control rooms by more than a month in educational-age during their two-

year sojourn through the test-period. This fact suggests that the pupils in the better-lighted rooms may have studied longer or perhaps with greater concentration than did those in the control rooms. These reactions of the subjects would tend to give rise to the observed differentials in the refractive states of the eyes. If the refractive changes indicated in the present research are assumed to be real, the apparent influence of better lighting is to substitute tonic accommodation for relative accommodation in counteracting hyperopic errors which existed among these school children.

It appears safe to assume that improvements in seeing conditions should have measurable beneficial effects upon eyesight.[2] Certainly the permanent deleterious effects of eyestrain upon eyesight are a matter of common observation, at least in extreme cases of severe prolonged tasks of difficult seeing. The eyesight profession is interested in improving and conserving eyesight beyond the immediate benefits of eyeglasses, treatments, etc. Eyesight specialists who have opportunities to test the vision of groups of persons before seeing conditions in a school, office or industry have been improved in some manner, such as by better lighting, and for a sufficient period thereafter, are in a position to add to the present knowledge of the contribution of various aids to seeing in conserving vision.

REFERENCES

1. Functional Adaptation to Near-Vision, Matthew Luckiesh and Frank K. Moss. Journal of Experimental Psychology (March, 1940).
2. The Science of Seeing, Matthew Luckiesh and Frank K. Moss, D. Van Nostrand Company, New York, 1937.

Current Comments by Carel C. Koch

Editor, American Journal of Optometry

Optometrists will confer a favor by sending for this department items of news of general interest; such as relate to new instruments, clinical techniques, education, public health and optometric legislation.

JACK ISADOR KURTZ

Dr. J. I. Kurtz, optometrist and member of the editorial board of the AMERICAN JOURNAL OF OPTOMETRY, died in Minneapolis, November 15, of myocarditis, following an illness lasting more than a year. Dr. Kurtz was born in Russia, August 17, 1891.

After his preliminary education he received the degree of Bachelor of Science in Applied Optics from the Ohio State University in 1917. During the World War he served in the Eye Department at the Base Hospital at Camp Dodge. He later received his Masters Degree from the University of Minnesota in which state he was also licensed to practice as an optometrist. In the year 1920 he married Beatrice Cohen.

In 1925 he became a fellow of the American Academy of Optometry and in 1936 was awarded a fellowship in the Distinguished Service Foundation of Optometry. During his career as an eminent Minneapolis optometrist, Dr. Kurtz was active in his local optometric society, the Minnesota State Association of Optometrists and the Minnesota Academy of Optometry, serving these organizations in a number of capacities. For the past six years he has served as a member and Secretary of the Minnesota State Board of Examiners in Optometry.

Dr. Kurtz gave especially of his services in the foundation of the AMERICAN JOURNAL OF OPTOMETRY, and his assistance was of incalculable value in making this technical journal one of the outstanding publications dealing with the refractive and neurological problems of vision. As a member of its staff he was instrumental in making it reflect constantly the progress of American optometry and the development of refractive science.

His own contributions to the advancement of his specialty included many articles on accommodative near point tests, orthoptic problems and procedures, malingering and ocular physio-therapy. He was author

JACK ISADOR KURTZ—1891-1939

of the book, *The Principles and Practice of Ocular Physical Therapy for Optometrists*, published in 1931.

The death of Dr. J. I. Kurtz is mourned by innumerable optometrists and laymen who admired his facile mind, his steadfastness of purpose and his faithful friendship. He was a recognized leader in every activity in which he took part. He worked constantly in behalf of the highest ideals of optometrical science. His manner was kindly and his presence was a personification of sincerity and humanity which are the characteristics of a truly great optometrist.

THE PUBLIC HEALTH AND PUBLIC RELATIONS PROBLEMS OF OPTOMETRY

The American Optometric Association is the logical and proper organization to supply leadership for the profession. Representing as

it does a large number of practicing optometrists, the profession naturally turns to its officers and executive council for that specific brand of clear thinking and efficient policy making which should characterize the foremost organization in optometry. Not only do optometrists expect far-sighted planning for the profession as a whole, but they also expect vigorous and purposeful action in the carrying out of these plans. The organization itself was designed for this very work. It was created and developed to serve optometrists. Professional people benefit as the result of collective counsel supplied through an organization of this character, provided the leaders of its administration are sincere in their desire to improve conditions and are capable of doing the straight thinking that is needed.

Optometry today faces several outstanding problems which should be the chief and major concern of the present administration of the A.O.A. These problems are so important and their proper solution will have such a far reaching effect upon our profession that nothing else should be permitted to interfere with their solution.

The first of these problems is that of public health. As far as ocular work is concerned, various individual state programs in the health field should be as uniform as possible and in the effort to accomplish this the A. O. A. should work in close harmony with its state affiliates. In coming state legislative sessions, not only will the A. O. A. be called upon for advice when these matters are being considered, but our national organization will undoubtedly be called upon for help and must be prepared to stand-by, ready to furnish factual information, legal assistance, educational material, organization procedure, and at times even money to various state optometric associations.

To do this work effectively will require trained personnel and much important pre-legislative activity. The value to optometry of success in these endeavors is obvious, and many state associations will need this service. It is, however, a type of service which requires much careful planning and thought. Weeks of careful preparation at this time will do much towards smoothing the roads of affiliate optometric organizations when they appear before the health committees of state legislative bodies to present the cause of sound and thorough ocular work. The time to arrange these important matters is now, and we are happy indeed to learn that the optometrist, Feinbloom, of New York City, has undertaken this task and is now developing the organization needed to suc-

cessfully carry on this important program. Feinbloom has already shown the profession the capacity to do constructive work, and under his leadership the writer is certain that these vital economic subjects will be given the most careful study, and under his direction the profession's future in the field of public health is assured.

The second of these problems has to do with public relations activities for the entire profession. This work, too, is obviously the responsibility of the A. O. A. It is the type of activity that can be best handled by a large national association and is an activity which should be stressed by that organization at this time. The work would not have to be initiated on a vast scale. The start could be modest. A professional public relations man could be employed and a reasonable appropriation made for this department. In the hands of a capable man much of value to both the public and optometry would ensue. Some of the present officials and leaders of the A. O. A. have discussed entering this field for years, but nothing was ever done. The time is now ripe for this effort. Optometry needs the services of a public relations counsel and it is the duty of the present administration of the A. O. A. to rearrange its affairs so as to give this needed service to the members of our profession.

These facts were brought out by the optometrist, Van Kirk, in the annual report of the Committee on Public Relations of the A. O. A. This committee report was presented to the delegates at the recent congress of that body in Los Angeles, and was published in full in the JOURNAL OF THE AMERICAN OPTOMETRIC ASSOCIATION, Vol. XI, No. III., pp. 81-85, 1939. The report suggests the immediate creation of a vigorous department of public relations. A department which would properly present optometry to the public at large. Van Kirk suggests that this work start in a small but thorough manner. His report was well prepared and his suggestions were sound. The cost was moderate and the A. O. A. could well defer other of its activities in the light of the importance of this major problem. Optometry needs the services of a public relations director, and it is the duty of the present administration to furnish these without further delay.

But instead of a vigorous and forward looking program of public relations, we find our large national association devoting its energies to such unimportant and unnecessary proposals as the establishment of a National Examining Board. A proposal which because of its lack of value to optometry is sure to cause some controversy, and thus screen for the moment the fact that the A. O. A. is doing but little at this time

to follow the suggestions made by Van Kirk and his committee on public relations. And doing but little to grasp one of its real opportunities for outstanding service for the profession.

Public health and public relations problems logically belong in the hands of the A. O. A. Both are of such character that they can no longer be ignored. Optometrists properly turn towards the A. O. A. for the guidance and leadership needed at this time in getting underway the necessary steps which must be taken if these vital problems are to be solved. Both of these major issues require immediate action. With the turn of the new year let us hope that the administration leaders of our large national society will face these facts, and immediately remold the policies of that organization to meet both of these questions. If nothing else is done, their time will be well spent. It is of the greatest importance to our profession that they now effectively place in motion the necessary machinery to constructively care for the needs of the profession in the fields of public health and public relations. Feinbloom has started his good work on the former. Now is the time to give Van Kirk and his committee the opportunity to serve optometry on the latter problem.

OPTOMETRY AND ALLIED FIELDS OF PRACTICE

It has been the writer's contention for years that optometrists were satisfied in being optometrists. Satisfied to serve the public as eye men specializing in the refractive and neuro-muscular abnormalities of vision. Proud, if you please, of our three hundred year heritage in the world of physics and optics and anxious to retain for our profession this fine technical background now enjoyed by us as optometrists. And hopeful, too, of further improving our standards of eye work so that the laurels already won for our splendid profession will be preserved, for the generations to come, under the banner of optometry.

It is true that from time to time the suggestion has been made that optometrists invade fields already occupied by other professionals. These suggestions have been but infrequently made and come for the most part from a few disgruntled practitioners. The rank and file of optometry have never had a hand in these sporadic activities nor have they taken any particular notice of them.

It therefore came as somewhat of a surprise to the writer to find in the BULLETIN OF THE OPTOMETRIC EXTENSION PROGRAM, October

17, 1939, the following sentence, "If you are an optometrist—legally—it does not matter whether you yearn to practice as a limited-medical practitioner, a complete medical practitioner, a naturo-path or as a straight, head-up and shoulder high optometrist and proud of it—here is the thing you must know to succeed . . ." The article from which the above was taken was written by the optometrist, Alexander, who is the National Director of the Optometric Extension Program.

From the tone of the above it would indicate that the optometrist, Alexander, believes that a number of optometric practitioners are yearning to be something other than that which they are. His writings indicate that he believes a fair per cent of his readers have the desire to practice in fields other than their own. The sentence implies that if given the opportunity, many optometrists would forsake optometry and attempt to practice in other than ocular fields. In this Alexander is very much mistaken.

The writer is constantly in communication with optometrists in every part of this country. As an editor, it is necessary for me to maintain the closest contact with practitioners everywhere and keep informed as to the trends of thinking within the profession; and with the support of a fine staff and a willing group of optometric collaborators this is made possible. With this background of optometric thinking, the writer is able to refute in full the evident contention of Alexander that there is a "yearning" on the part of any substantial number of optometrists to practice as either limited medical practitioners or as medical practitioners.

Optometrists are not anxious to practice in other fields. They are, however, concerned with the newer technical developments in the ocular field, and are constantly attempting to improve their own optometric practices by making use of opportunities as these present themselves for graduate training. The very existence of the Optometric Extension Program proves this point. The profession, as a whole, is interested in doing a better and better piece of eye work; but it is not in any way interested in invading medical fields. Optometric writers who infer this are doing the profession an injustice, and at the same time they are antagonizing other professionals, thus disrupting concordant relationships which must and do exist between various professions and optometry.

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A REVIEW OF CERTAIN CASES OF OCULAR ABNORMALITY IN WHICH GENERAL PATHOLOGY WAS A FACTOR*

In considering the relationship between general pathology and ocular abnormalities, it is now generally felt that there exists between the tissues of the eye, and those of the rest of the body, a developmental and structural relationship which may also be carried over into the realm of pathology. There is evidence which leads one to believe that tissues which are derived from the same embryonic layer and which are similar in structure, will react in a similar manner to various pathologic conditions in whatever portion of the body in which they are situated. For instance, from the developmental standpoint, the epithelium of the cryatalline lens, the conjunctiva and the cornea of the eye is said to be derived from the ectodermal covering of the embryo. The optic nerve and

*The fourth of a series of nine papers dealing with clinical case reports, by Carel C. Koch, Opt.D., F.A.A.O. The fifth of this series will appear in the January, 1940, issue of the AMERICAN JOURNAL OF OPTOMETRY.

the retina of the eye as well as the brain are derived from the neural ectoderm, and the remaining tissues of the eye are said to be mesodermal in origin.

In somewhat like manner, various pathological involvements affecting tissues in remote parts of the body, seem at times at least, to affect the tissues of the eye. Infections of various kinds, tumors, disorders of the nervous system and maladjustments of nutrition, as well as pathology of the vascular system, all produce in certain cases, ocular manifestations which can only be corrected by means of general therapeutic measures. These are facts of which all optometrists are well aware, and the examination made by optometrists includes tests to determine the presence or absence of indications of these involvements.

In a paper dealing with ocular and general pathology[1], the writer has already discussed at some length, the professional duties of the optometrist. Inasmuch as these duties have an important bearing on one phase of the work of the optometrist as covered in this fourth paper of this series, it may be well to briefly review what has become the accepted standard of optometrical procedure with reference to evidence of ocular and general disease as indicated by the case history, the external and ophthalmoscopic examinations, and the visual field tests, as made as part of their regular eye examinations by optometrists.

Just what are the professional duties of the optometrist? As the writer has said before, to understand this question we must first consider the field the optometrist is to occupy in this small division of general health work that has been allotted to him. His primary duty is that of correcting errors of refraction and imbalances of the accommodation-convergence relationships. In other words, he is to correct errors of refraction which in some way affect vision and he is also to correct ocular neuro-muscular involvements which also have a bearing on experiencing normal comfortable vision when using the eyes at the near point. These are his duties as prescribed by law in every state in this union.

It at once becomes obvious that this cannot be done with any degree of satisfaction or with any degree of assurance that it is being done properly, unless the optometrist also includes in his examination routine, such tests as would indicate and thus eliminate those few

[1]A study of the training given student optometrists in the field of diagnosis of eye pathology and relating general disease. Carel C. Koch. AMERICAN JOURNAL OF OPTOMETRY. Vol. 15, No. 2, pp. 47-79, 1938.

patients who were suffering from ocular pathology or from a reflex eye symptom of some remote general involvement from among the many who were suffering only from an uncorrected error of refraction and possibly imbalances of one or more of the ocular muscles.

In other words, it is the duty of the optometrist to diagnose and prescribe for errors of refraction and to correct imbalances of ocular muscles. But at the same time, it is his implied duty to do these things, only after ascertaining, to the best of his professional ability the fact that the eyes upon which he is working, are free from disease or incipient pathology which should first be treated by an oculist or a physician before the optometrist corrects the visual problems which remain.

While this is not a legal requirement, it is, from the professional standpoint and from the point of view of public well being, a fact that every ocular examination for refractive errors, should be preceded by a careful examination of the eyes with the sole purpose of determining the exact status of those eyes in regard to the presence or absence of indications of pathology. Optometry has realized this fact for many years and educational centers have sent forth thousands of capable refractionists in the form of optometrists who have been taught to first make these necessary diagnostic tests, and second which is even harder and more important, been taught to do the skillful diagnostic work necessary to differentiate the normal eye, free from pathology, from the few abnormal pathological ones.

The clinical case reports which follow, indicate that optometrists are alert to their responsibilities in the matter of carefully studying each case for evidence of ocular or general disease. These reports are but few of the many similar reports which could have been included in this paper. These reports are taken from established sources of technical literature and are all from comparatively recent periods. They were all written by competent eye specialists and have been summarized here by the writer, each report, however, still containing the important facts as presented in the original.

Case Report No. 52

Lees reports the following case in the OPTICIAN, Vol. XCVI, No. 2485, p. 254. Patient, girl, age 14. Patient complains of very severe headaches. A physician had made a diagnosis of tuberculosis some eighteen months before and had been treating the patient during this period. The optometrist Lees examined the patient and found but little refrac-

tive error. His ophthalmoscopic examination, however, indicated in the left eye the early stages of papillitis and the patient was so informed, as was her physician.

The physician, suspecting a brain involvement, sent the patient to an infirmary. Here she was examined by four specialists who reported that there was nothing wrong with the patient. Her eyes were claimed to be normal and no evidence of tuberculosis could be found. The patient still suffered from the unexplained headaches, however, and again consulted the optometrist Lees. A further ocular examination was made which convinced the optometrist that the matter was too serious to neglect. He then referred the patient to a brain specialist who made a diagnosis of brain tumor and successfully operated. In a short period the patient had recovered and the symptoms were relieved.

Case Report No. 53.

Brombach reports the following case in the 1937, LECTURES OF THE NORTHWESTERN CONGRESS, p. 231. Patient, male, complained of general ocular astenopia and an inability to read with comfort. Several oculists had been consulted during the last six years, but the prescriptions for glasses had never proved satisfactory. The optometrist Brombach examined the patient and found the fundus, visual acuity and present glasses to be normal and satisfactory. A visual field examination was then made which indicated a focal infection. An oral surgeon was called in consultation, several teeth removed and the condition at once improved.

Case Report No. 54.

Lieberthal reports the following case in the BULLETIN OF THE NEW YORK OPTOMETRIC SOCIETY, Vol. 5, No. 10, pp. 5-6. Patient, housewife, consulted Lieberthal because of a reoccurring ocular inflammation. She had been under the care of an oculist, who had failed to locate the seat of the infection. The optometrist Lieberthal after a complete ocular examination suggested a dental examination. This was made and a second bicuspid removed. The eye condition cleared up within two weeks and there has been no reoccurrence.

Case Report No. 55.

Baxter reports the following case in the AMERICAN JOURNAL OF OPTOMETRY, Vol. 5, No. 5, p. 223. Patient, female, occupation housewife. Suffered from violent eye disorders and nervous symptoms. Her

oculist was consulted and he prescribed glasses. Results were negative. The patient was then referred by her family physician to the optometrist Baxter for an eye examination. In viewing the interior of the eye with an opthalmoscope, Baxter noticed that in following the course of the retinal vessels, particularly the many terminal and tortuous arteries, here indents were noted at the points of crossing the veins. Her physician was called in and the condition shown and explained to him. Exhaustive tests for focal infections were made and none found except a suggestion of two clouded teeth with X-Ray. One of them was extracted, it was sound and no infection found. Three days later a profuse flow broke through the wall of the adjoining suspected tooth. This condition was corrected and the patient improved rapidly.

Case Report No. 56.

Parkins reports the following case in the YEAR BOOK OF THE NEW YORK STATE OPTOMETRIC ASSOCIATION, 1933, p. 290. Patient, housewife, age 51. Her refractive error did not account for her symptoms and the optometrist Parkins referred her to her family physician. She was somewhat overweight, her urinalysis was negative, blood count negative and Wasserman negative. General physical examination showed no abnormalities except a blood pressure, systolic of 275. It is of interest in this case to note that this patient's blood pressure could be and was reduced to 160 systolic in a very short period of time by having her wear a pair of 5△ base-up prisms. Neither her physician, who verified these blood pressure findings nor the optometrist Parkins can explain this latter phenomena.

Case Report No. 57.

Churchyard reports the following case in the OPTICIAN, Vol. XCVI, No. 2496, p. 458. Patient, female, age 49. Patient complained of most unusual migraine symptoms, the headaches being very severe. She complained of suffering from migraine for years. She was used to an attack at least once a week and at times oftener. No doctor had been able to relieve her. The optometrist Churchyard examined the case and prescribed the following corrections.

Distant correction.
O.D. +1.25 D. Sph. ⌒ 1△ Base-In.
O.S. +1.25 D. Sph. ⌒ —0.50 D. Cyl. axis 80 ⌒ 1△ Base-In.

Reading correction.
O.D. +2.75 D. Sph. ⌒ 1△ Base-In.
O.S. +2.75 D. Sph. ⌒ —0.50 D. Cyl. axis 80 ⌒ 1△ Base-In.

The result, claims Churchyard, was almost startling. She came back at the end of five months full of gratitude, stating that not only had she had no difficulty in getting used to the glasses, but had not had a single attack of migraine since she had had them. She had worn them constantly as directed.

Case Report No. 58.

Sutcliffe reports the following case in the REFRACTIONIST, Vol. 22, No. 373, p. 353. Patient, female using a hyperopic correction. This patient had a family history of four cases of cataract on or before age 40. The patient showed lenticular striae, and the optometrist Sutcliffe referred her to her general practitioner with the suggestion that she be placed on a diet strong in Vitamin D. The practitioner agreed and advised her accordingly. After three months Sutcliffe reports that the ophthalmoscopic evidence of striae have subsided considerably.

Case Report No. 59.

Lees reports the following case in the OPTICIAN, Vol. XCVI, No. 2485, p. 254. Patient, female, age 39. The patient consulted the optometrist Lees who examined her eyes. His ophthalmoscopic diagnosis of the fundii indicated an abnormality of the discs and the patient was immediately referred to a special eye hospital. Here she was examined by an oculist who also had a number of student-oculists examine her with the ophthalmoscope. The oculist in charge pronounced her eyes to be normal in every way, and told the patient she had nothing to worry about. In three months the patient was dead. Tumor of the brain being the cause.

Case Report No. 60.

Baxter reports the following case in the AMERICAN JOURNAL OF OPTOMETRY, Vol. 5, No. 5, p. 223. Patient, female, occupation, housewife. Patient had many headaches and nervous symptoms. A local oculist had fitted her with concave lenses. These proved unsatisfactory and her family physician referred her to the optometrist Baxter. An ocular examination by him disclosed the need for convex lenses for reading and also a dental infection. Glasses were prescribed and the infection cleared up and the symptoms disappeared.

Case Report No. 61.

Swann reports the following case in the OPTICIAN, Vol. LXXXVIII, No. 2275, p. 204. Patient, female, age 80. She had recent-

ly suffered from high blood pressure and was under medical care. A hemorrhage in the vitreous of the left eye had brought on acute glaucoma. This was diagnosed incorrectly and called neuralgia. Her specialist prescribed tablets and the vision of the left eye was lost. The optometrist Swann examined the eyes of this patient and concluded his case report as follows, "The eye might have been saved had the true nature of the condition been recognized at the time."

Case Report No. 62.

Raphael reports the following case in the SOUTH AFRICAN OPTOMETRIST, (Johannesburg), Vol. V, No. 3, p. 70. Patient, female, age 53. The optometrist Raphael prescribed the following correction for this patient which was worn for five months with complete comfort.

O.D. —0.25 D. Sph. ⌒ —0.50 D. Cyl. axis 170
O.S. —0.75 D. Sph. ⌒ —1.25 D. Cyl. axis 10
Add, O.U. +2.00 D. Sph. in bifocal form.

This correction gave her the following distance visual acuity, O.D. 6/6, O.S. 6/6. Near-point normal. At the end of five months she again consulted the optometrist Raphael saying that the right eye had become completely blurred. Her uncorrected vision had dropped from 6/18 to 6/60 in the right eye. Using an ophthalmoscope, Raphael found that the reflex had become dull and also found a fairly large hemorrhage near the macula. The optometrist Raphael at once referred this patient to an oculist.

The oculist then examined the case and told the patient that a blood vessel had burst in her eye and then prescribed the following reading correction, telling her not to worry. Nothing else was done.

O.D. +2.00 D. Sph. ⌒ —0.25 D. Cyl. axis 180
O.S. +1.50 D. Sph. ⌒ —1.25 D. Cyl. axis 10.

This correction did not improve matters, and the patient became exceedingly dispirited over her condition, and more or less resigned to having but one useful eye.

Some time later the patient felt something sharp in the gums of the upper jaw and decided a piece of the root of a tooth must be coming through, although it had been twenty years since she had had all of her teeth extracted. A dentist was consulted who found a complete tooth which had been embedded in the upper jaw. This was extracted and the visual acuity of the right eye immediately started to improve. The patient

again consulted the optometrist Raphael who prescribed the following correction which gave the patient normal vision.

O.D. — .025 D. Sph. ⌒ —0.75 D. Cyl. axis 180
O.S. —1.00 D. Sph. ⌒ —1.25 D. Cyl. axis 180
Add. O.U. +2.50 D. Sph. in bifocal form.

Case Report No. 63.

Neill reports the following case in the AMERICAN JOURNAL OF OPTOMETRY, Vol. 10, 4, p. 128. Patient, housewife, age 70. Suffered from a complete bilateral ptosis of the upper lids following a cerebral hemorrhage which also caused a paralysis of the arms and legs. Her physician had strapped her upper lids open with adhesive tape stretched from the lids to the forehead. The optometrist Neill constructed two ptosis crutches and attached these to the patient's glasses which enabled her to keep her eyes open while lying in bed. Neill also reports that after several months time, the patient was able to open her eyes for short periods in the morning without the aid of crutches and that after one year the crutches were required only in the evening when the patient was tired.

Case Report No. 64.

Baxter reports the following case in the 1934 YEAR BOOK OF THE NEW YORK STATE OPTOMETRIC ASSOCIATION, p. 337. Patient, male, age 38. Chief complaint, poor vision. His oculist prescribed "drops" for his eyes which he had used for six weeks without an improvement in his visual acuity. The optometrist Baxter examined him and found his vision to be Right Eye, finger vision at 12 feet. Left Eye, finger vision at 15 feet. This could not be improved with lenses. After some study of the case history and the examination findings, a diagnosis of tobacco-alcohol amblyopia was made. Total abstinence of both tobacco and alcohol was obtained in time, and the patient's vision increased to 20/30 O.U.

Case Report No. 65.

Kurtz reports the following case in the AMERICAN JOURNAL OF OPTOMETRY, Vol. 8, No. 10, pp. 349-352. Patient, female, age 68. Occupation, housewife. Was brought to the office of the optometrist Kurtz for an ocular examination December 23, 1930. Her general health was good until recently. She had eight children, all living but one. Her chief complaint was dizziness. This was especially bad when she first tried to change from a sitting to a standing position. If some one helped

her to stand up and steadied her for a few moments, she was then able to stand up by herself and walk for a short distance without any assistance. If she tried to stand by herself, she had a tendency to fall towards the left side. Her sight, she complained, was failing her.

The left eye turned out completely to the temporal side and was about 80 per cent closed. She had practically no control over its lateral movement. The right eye appeared normal externally with the exception of a slight amount of turning to the right temporal side. When asked to look with that eye to the nasal side she could bring it in to the median line only, indicating that the right internal rectus was also involved. This condition she claimed became first manifest about three months ago and was getting worse gradually until diplopia set in.

She had been for an examination and observation at a leading hospital and was finally given a pair of single vision glasses and discharged. Not noticing any improvement, she consulted a local oculist who told her she needed different glasses and prescribed a pair of bifocals O.U. +1.00 D. Sph. with a +3.00 D. Sph. addition. These also proved of no value. When she came back to him and complained of the diplopia, he told her that it would disappear as soon as she was used to the glasses. Two or three weeks later, she called again and complained of her dizziness and diplopia. He then put an occluder over the left eye. This of course, eliminated the diplopia but her condition continued to get worse. Her vision without lenses was O.D. 20/25, O.S. 20/200. With lenses, her vision was O.D. 20/20; O.S. 20/40. The pupillary reaction to light was somewhat sluggish. Ophthalmoscopic examination was negative. With some difficulty, a color and form field test was made and it revealed a marked contraction and interlacing of both form and color fields, the contraction being typical of the brain tumor type.

From this examination, Kurtz suspected that the patient had a brain tumor. Accordingly, the patient was sent to a physician for a complete physical examination with a request for a detailed report. The report was negative. Many spinal punctures were done and X-Rays made of the skull. All were negative. The physician advised Kurtz to give her diathermy treatments as he thought that this might be of some help to her. Kurtz told him that he suspected a brain tumor and for this reason did not wish to treat this case.

January 2, 1931, the patient was sent to a neurologist for an examination and on the sixth the following report was received: "Con-

dition apparently due to involvement of the cranial nerves at the exit from the skull. Further study necessary to determine." Two other neurologists were called in on the case and after some study and observation, the diagnosis was rendered as "progressive muscular and nerve atrophy, cause undetermined." Kurtz then turned the case over to the physician for general and ocular diathermy treatments, the patient being sent back to him at intervals for an ocular examination to determine whether the treatments were improving the condition. Treatments were given three times a week on alternate days.

On January 21, 1931, an examination revealed O.U. ophthalmoscope negative: O.D. vision without lens 20/25 O.S. 15/200. Right eye turned out about the same amount as before. The up and down movements seemed also to be affected. Left eye closed completely. After consulting with the physician, it was decided that he continue the treatments for a longer period and then send the patient back for another ocular examination.

On February 7, 1931, an examination revealed that her ocular as well as her general condition was definitely worse. Vision O.D. was 20/50. The right eye turned out considerably more to the temporal side than before. It was also about 60 per cent to 75 per cent closed. She no longer could stand up even with the help of others. She actually had to be carried. After consultation with her physician, it was decided that the treatments were of no help and she was advised to discontinue them. Her condition became worse right along until by the end of February she was practically blind and paralyzed, although she never complained of pain. She was taken to the hospital on March 2, 1931, and died at 6:30 P. M. the same day.

An autopsy was performed by members of the hospital staff and the findings were as follows: "The scalp and calvarium are normal. The brain bulges through the dura when it is incised. There is no flattening of the convolutions and when the brain is removed there are no pressure cones around the hypophyseal region or the medulla. There is a marked amount of fluid under the arachnoid. When the corpus callosum is split the basal ganglia of the left hemisphere are found bulging into the 3rd ventricle. Section of the brain does not reveal any abnormal mass except that a definite hardness is found over the basal ganglia which differentiates this region from the rest of the brain. No other local changes are found.

"Microscopic examination of the basal ganglia shows increased

number of neuroglia cells and fibres; marked stellitosis of all the nerve cells; one giant cell is found, confirming the diagnosis of glioma.

"Diagnosis:

"1. Glioma of the brain.

"2. Increased intracranial pressure (fluid)."

The points of interest in this case are according to Kurtz, (1) The fact that extrinsic ocular muscles and nerves were first attacked. The lack of the choked disc picture as well as the lack of characteristic symptoms of headache, pain, etc. (2) The way the patient was fitted with glasses by the first hospital oculist and later on by the second oculist when the patient had a brain involvement and not a refractive condition. (3) That the field test gave a better clue as to the possible cause of her trouble than the physical examination, X-Ray and neurological test, and (4) That the autopsy finding confirmed the original diagnosis of brain tumor, as made by the optometrist Kurtz.

Case Report No. 66.

Farmer reports the following case in the AMERICAN JOURNAL OF OPTOMETRY, Vol. 4, No. 8, p. 238. Patient, male, age 30. Complained of visual fatigue, eyes watering and some pain in the orbital region. He had just been examined by an oculist who told him that there was nothing wrong with his eyes and advised him to take more exercise. The optometrist Farmer examined the patient and found some slight hyperopia and astigmatism, and an abnormally high pulse rate. After several post-refractions the patient was referred to a physician who verified a suspected diagnosis made by Farmer of exophthalmic goitre. This case was operated on with an uneventful recovery.

Case Report No. 67.

Lees reports the following case in the OPTICIAN, Vol. XCVI, No. 2485, p. 254. Patient, female, age 47. Had been examined by the optometrist Lees in 1936. At that time he had prescribed the following correction which gave normal vision.

O.D. +0.75 D. Sph. ⌒ +0.50 D. Cyl. axis 105
O.S. +0.25 D. Sph. ⌒ +0.50 D. Cyl. axis 95.

A year and a few months later the patient returned with a history of poor vision in the right eye. This had come on during the preceeding few months. She also reported that she had fallen in the street on several occasions through the sudden temporary paralysis of the left side of

her body. She also complained of a feeling of pressure behind the right eye. An ophthalmoscopic examination of the fundus of the right eye by the optometrist Lees disclosed a definite inflammation of the right optic disc.

The patient also reported that she had been under the care of her physician for some time, and so a letter was sent to him by Lees suggesting the possibility of brain tumor and suggesting that he take steps to investigate the matter. The physician handed the patient the letter he had received from Lees on her next visit to him. At this time he abused Lees to whom he referred as a "Windy-Lizzie" and told the patient he could handle his own cases without outside interference.

Having read the letter the patient returned to the optometrist Lees in a rather distressed state of mind. Here she agreed to consult a second physician, who after an examination said her condition was due to "shock." On attempting to describe her symptoms to this second physician she had been rudely silenced by this surgeon who had observed that he would do the talking.

Six months later the patient's husband called upon Lees to tell him that his wife had just been buried. He still had the letter Lees had written to the first physician, and thought Lees would be interested to know that the post mortem examination revealed brain tumor as the cause of her death.

SUMMARY:

These cases indicate that optometrists realize that glasses are occasionally not the solution of eye troubles. Some of the ocular conditions the optometrist may be called upon to correct are due to imbalances of the accommodation-convergence relationships. In these cases orthoptic exercises are indicated. Other of the conditions which do affect the eye at times are due to disease. This may be external and apparent to the most casual onlooker, but it also may be internal and not discoverable except by an expert opthalmoscopic examination by a specially qualified optometrist or oculist. Optometrists are trained to realize that the eyes are not mere optical instruments, but are, in every sense, members of the body, sharing in all defects and distresses of the body, and he who would be an expert in ocular problems must first have a knowledge of general anatomy and physiology as well as special training in pathology with particular reference to the eye. If the patient seeks the advice of someone without this special training and experience necessary to make a proper

examination he may in all good faith be ordered to wear glasses which possibly may improve the vision to some extent and by this very fact lull the patient into a false sense of security. The disease, whether due to the eye or to the bodily health, will thus be overlooked, and much valuable time will be lost in applying remedies with possible serious risk.

—CAREL C. KOCH.

PROCEDURE AND INSTRUMENTATION

By Guy L. DuPlessis

A department wherein discussions will be carried on relative to the value of various experimental and clinical techniques as employed by practicing optometrists, and also in which the instruments used by optometrists in various phases of their work will be subjected to some critical evaluation.

NOTES ON ROTARY MOTION IN ORTHOPTICS

Instruments have appeared in the last few years, designed presumably to make orthoptics a semi-automatic operation, and relieve the optometrist of the drudgery of manual operation of prisms as formerly employed for many years. One feature common to most instruments of today is some sort of oscillating or rotary motion, hereinafter referred to as rotary movements. The reasons offered for the incorporation of these rotary movements have been very indefinite. These movements were perhaps originally inspired by the old version exercises, and were said to relax or break up spastic conditions of the ocular muscles and to improve their tonicity. This is a doubtful explanation at best.

I should like to call attention to the fact that observers have come to the conclusion that of various ocular conditions yielding to treatment, convergence insufficiency is that most favorably affected by orthoptics. I should like to refer also to the experiments and conclusions published earlier in this journal, which indicated that in the treatment of convergence insufficiency, only a little more than 55 per cent of the cases treated showed satisfactory improvement. And also to the conclusion that the manner of treatment or the technique, whether it was the rhythmic ap-

plication of prisms to the breaking point or merely following a rotating target, all seemed to produce more or less similar clinical results.

In considering orthoptics, one fact has been ignored by nearly all optometrists and orthoptic specialists, and that fact is Listings Law. An exception is the optometrist Fjelstad[1], who in 1928 called attention to cyclophoria as a cause of recurring convergence insufficiency. The writer, too, in several articles published in 1935[2] [3], called attention to the importance of the much neglected oblique muscles and suggested, as advised by Stevens and Savage, that their studies would perhaps yield solutions to many orthoptic problems and answer a number of questions as to some of the orthoptic phenomena.

In speculating on the value of rotary motion and on its more or less unexplained success in developing convergence, we should recall that the vertical recti muscles and inferior oblique muscles are controlled by the third nerve, the same nerve which controls the internal recti muscles. In rotary motions of the eyes, these muscles are involved in their synergic as well as in their associated action. It thus follows that vertical motion whether induced by mirrors, prisms, or by other means, assists in developing convergence.

We also know that when the position of regard is changed from the primary position to any oblique secondary position, that the oblique muscles perform a compensating torsion to keep the ocular image on corresponding points of the retina. Again the sixth and third nerves are involved. The angular displacement of these motions is small compared to that of the internal recti. More important, perhaps, is the amount of involuntary innervation that they require. If we consider convergence as partly an unwilled function and partly a willed function, of what influence are the oblique muscles in producing new accommodative convergence relationships?

It is possible to develop torting power to a certain degree. To my knowledge no one has tried to measure changes in converging power following development of torsional power. Some time ago, I treated a case of convergence insufficiency, using the usual methods. This case, incidently, showed one degree of left hyperphoria. The amount of innerva-

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[1]Fjelstad, E. O. Cyclophoria as a cause of recurring convergence insufficiency. AMERICAN JOURNAL OF OPTOMETRY, Vol. 5, No. 1, pp. 33, 1928.

[2]DuPlessis, G. L. Astigmatism-Torsions and their effect on each other. AMERICAN JOURNAL OF OPTOMETRY, Vol. 12, No. 1, pp. 11-28, 1935.

[3]DuPlessis, G. L. The oblique muscles in ocular rotation and astigmatism. AMERICAN JOURNAL OF OPTOMETRY, Vol. 12, No. 12, pp. 459-464, 1935.

tion reaching the internal recti was increased as the result of the treatment, and when finished the patient could overcome with ease 80 prism diopters base-out, that amount being the limit possible with my equipment. The patient derived complete comfort as the result of these treatments. Some time later she commented that as a result of the treatments, she had gained control of her eyes and could cross one or the other, or both at will, and this she proceeded to demonstrate. It was noted that with her eyes in the position of rest, that she was left hyperphoric one prism diopter, yet when she crossed her right eye in, the right eye turned up a considerable amount, thus causing a right hypertropia. This was also true of the left eye, though to a lesser degree. It was also noted that when overcoming strong prisms base-out, it was necessary to add some prism base-up over the left eye to aline the images prior to fusion. It thus appears, in this case, that convergence was markedly reinforced by the vertical recti of each eye, more so in the right than in the left. Some aid may have been rendered by the obliques, although this was not confirmed by tests.

It would therefore appear that the better results secured in orthoptics by the use of rotating targets, lie not in the mesmeric fascination of these devices, but in the correlated development of all third nerve pathways. If this is the case, considerable improvement can be made in designing the targets and in the techniques used with such devices. The writer will have further suggestions to offer along this line in the future.

THE FELDMAN ADAPTOMETER

This instrument, recently presented to the profession by the *American Optical Company*, is designed to give a quantitative determination of night blindness. Night blindness, or a lack of dark adaptation, is supposed to be of two types: organic and functional. Organic dysfunction of the ability of the eye to adapt itself to light can be due to retinal or choroidal disease. It can also be due to a lack of retinal circulation, such as in arteriosclerosis. It can be present in ocular disease such as glaucoma, wherein increased intra ocular tension interferes with normal function. In these cases the prognosis as to the correction of the night blindness is the same as the prognosis of the disease itself.

The functional type of the disorder is said to be due to vitamin A deficiency and is amenable to treatment. The use of the Adaptometer

therefore is limited to the diagnosis of vitamin A deficiency, so that these cases may be referred to the general medical practitioner. It is hardly suitable for the diagnosis of organic causes, as these may be better diagnosed by means of the ophthalmoscope and visual field studies.

The instrument consists mainly of a source of light called pre-exposure light, and of a test light consisting of an adjustable arrow. The test must be conducted in a dark room. The patient fixes the pre-exposure light for three minutes, when the exposure light is switched off, the test light is automatically switched on, and with a stop watch the length of time necessary for the patient to see and name correctly the direction of the arrow is measured. The qualitative measurement is therefore not one of light intensity, but one of time. Those patients requiring more than five minutes for adaptation are said to be abnormal, the average recognition time being slightly less than three minutes. According to the oculist, Feldman, a dark adaptation time of six minutes or more may indicate a definite source of danger in night driving.

As had been said before, the instrument is limited to the detection of avitaminosis A. Not being a judge in this matter, the writer must rely upon Feldman for the veracity of this claim. It seems to the writer, however, that the instrument is offered to the optometric profession for the study of light adaptation in avitaminosis A, rather than for the purpose of enabling optometrists to make a positive diagnosis of this condition. Some references have been offered to prove that avitaminosis can be diagnosed by the clinical measurement of the light adaptation functions of the eye, but naturally this clinical work is still in its early stages of development. The instrument seems to have possibilities, however, in bringing additional information on this subject to us all.

The adaptometer seems unsuited for the general comparative measurement of night blindness among motorists in visual surveys. The principal reasons being that this device requires a dark room, and secondly that the qualitative measurement is one of time; thus requiring too great an expenditure of time for practical use in rapid motor vision survey work.

In the October, 1939, issue of this journal, Koch, in *Current Comments*, p. 384, mentioned an article by Palmer which dealt with this subject. Palmer claimed that the variations in findings in photometric techniques made their use for diagnostic purposes unreliable. The writer disagrees with this conclusion of Palmer. It may be true that some tests

are none too reliable but this is, as a rule, the fault of the technique and not because the principle of photometric findings is at fault. Recent other tests have shown that certain photometric techniques are surprisingly reliable.

A NEW VISUAL ACUITY SLIDE

A new "21 Point Slide" for use with the projecto-chart has been announced by the *American Optical Company*. This new slide is designed for users of the "21 point technique," and is meant to facilitate the taking of eight so-called far-point findings in the precise manner as suggested by the Graduate Clinic Foundation. The tests referred to are the numbers 3, 4, 7, 8, 9, 10, 11, and 12 as usually employed in this refractive routine. The writer has not seen the slide as yet, but it is claimed that the use of this slide will greatly reduce the time required in making these various steps in the examination proper. In the writer's judgment, any device or method which would effectively reduce the time consumed in making an examination, or which could be used in simplifying the procedure, should be a welcomed aid to users of the "21 point technique."

SPECIAL REPORTS

A PLEA FOR SUPPORT OF SOCIALIZED HEALTH SERVICE BY OPTOMETRY*

Jack I. Kurtz, M.A., F.A.A.O.
Minneapolis, Minnesota

I have chosen this subject which has an economic and sociological aspect rather than a clinical aspect. We are always, as a rule, discussing at our Academy meetings, subjects which deal with the science and art of optometry. We usually discuss either theoretical or practical optometry. We must not overlook the fact that we do not practice optometry merely to earn our livelihood, but we also practice it for the sake of rendering a service which the public needs. Optometry is a part of the

*An abridgment of the material presented before the Minnesota Academy of Optometry, October 1, 1939. Submitted for publication, October 20, 1939.

whole system of Health Service. Optometry cannot be considered alone when we consider health service. It must be considered along with medicine and dentistry. It must be considered as an integral part of the whole organization associated with rendering health service.

In discussing this subject we must consider all of the following points: (1) Is the public getting proper health service under our present set-up? (2) Is the medical, dental, or optometric practitioner properly compensated under the present system? (3) Is Public Health to be considered a private or public business? (4) Is there a possibility that the present health system will be changed in the near future? (5) If the system of health service should be changed, what possible organizational form might it take? (6) How would the public benefit by such a change? (7) What part could optometry play in a system of socialized health service and would optometry benefit from such a change? (8) How would the professional men benefit? (9) Is the public getting proper health service at the present time?

These are important and timely questions. They have been studied by various organizations and foundations and there are various opinions as to their answers. The Committee on the Cost of Medical Care in the United States made an exhaustive five year investigation and it found that a large percentage of families in all income groups received no medical, dental, or optometric service at all. The following percentages of the population in this country do not receive medical care of any kind, according to this report. The groups are arranged according to their annual incomes.

Under $1,200	46.6%
$1,200-$ 2,000	42.2%
$2,000-$ 3,000	37.3%
$3,000-$ 5,000	33.4%
$5,000-$10,000	24.4%
Over $10,000	13.8%

A review of these figures will show that there seems to be a direct relationship between the annual income of each group and the amount of health service it receives. The lower the income of the group, the less health service it receives. The New York Academy of Medicine claims that preventable deaths of mothers at childbirth may be laid to the fact that they are not receiving enough medical care. Dr. Ray Lyman Wilbur, Secretary of the Interior in the Hoover Administration and a former President of the American Medical Association, also Chairman of the

Committee on Medical Cost has this to say on the subject: "The lack of adequate medical service lays a burden of pain, suffering, and inefficiency on this nation which, rich as it is, exceeds what we can afford. The question which faces the American people in the next ten years is not whether we can afford to provide ourselves with satisfactory medical service, but rather, whether we can afford to provide less than adequate medical care."

In any given year about half of the families with incomes of less than $2,000 a year receive no medical care whatever, and yet this is precisely the class of citizens that require the most health service, because of poor housing, undernourishment, and occupational hazards. This condition is not local, it is general in every state in the Union. It may only differ in degree.

While part of the American public goes without health service when needed, a number of medical, dental, and optometric practitioners have to get along with constantly decreasing practices and shrinking incomes. It is claimed that during the years 1925 to 1929, the average income of a physician was $5,000 per year. That income was reduced by approximately thirty-eight per cent in 1932, and it has not, to date, reached its former level. The Committee on Costs of Medical Care revealed in its report, that in 1929, for every physician who netted $10,000 per year, there were two others who netted less than $2,500, and for every dentist who netted $10,000 a year, there were four dentists who netted less than $2,500 a year. We do not know the present ratios, but it is safe to assume there has been no improvement. We must not overlook the fact that medicine and dentistry are the best paid of the professions dealing with public health. This condition is to be found not only in the United States, but also in other countries. The economic condition of the professional man engaged in health service is just as bad and possibly worse in certain other countries. This can be seen from the British Health Service report. This report is the result of a study made three years ago by the Political and Economic Planning Group. The report disclosed that England was spending about two hundred million pounds a year on maintenance and treatment of the sick and on the immediate measures against ill health. There are nineteen thousand panel doctors giving some fifty million attendances to the nineteen million insured persons under their care.

In our own country, during the depression, a number of physicians

and dentists were forced to turn to public relief. This was usually extended in the form of payment for the professional services they rendered to the F.E.R.A., the P.W.A., and other relief workers, in hastily established health centers for these groups. In a number of larger centers local medical societies brought pressure to bear which resulted in closing the clinics, and transfering these relief patients to the private offices of the practitioners who were then paid a minimum fee for their service from public funds. In Los Angeles, the writer understands that an elaborate system of public health centers were closed due to pressure of the local medical society. The system which replaced these health centers, I am told, proved more costly to the public and the service rendered was of a lower standard.

What about optometry? While we do not have reliable statistical information about the income of optometrists, one can assume, that for every optometrist who had an annual income of $10,000 there are five or six whose income is less than $2,500. From my observation and contacts both personal and through a wide correspondence, I am satisfied that the annual income of seventy per cent of optometrists is less than $5,000 a year.

Now as to the possibility of the present health system being changed in the near future. Before we try to decide optometry's place under socialized health service, it is advisable that we first discuss fully and frankly the possibility of a change in the present health system in this country. We have quoted earlier Dr. Wilbur's statement regarding the lack of medical care, and we have also indicated that between forty and fifty per cent of the people fail to get health service. There is another point of importance and that is the very unequal distribution of the cost of sickness:

10% of the families bear 41% of the total cost
32% of the families bear 41% of the total cost
58% of the families bear 18% of the total cost

These figures indicate that the ten per cent of the people in the higher income brackets spend over forty per cent of the total health bill in this country, and that about sixty per cent of the people spend only eighteen per cent of the total health bill. In connection with these figures, it may be interesting to point out that only ten per cent of the people of the United States have annual incomes of over $10,000 and that ninety per cent have incomes considerably less than $10,000. An

analysis of these two figures will reveal the following facts which are of importance to those in any way connected with rendering health service:

1. Only a few practitioners in each profession who happen to serve the ten per cent of the families in the highest income bracket have high annual incomes, because these families spend forty-one per cent of the total health bill, and they have the money to pay these bills. These figures, incidentally, explode the statements often made that the professional man of the highest ability is the most successful financially. The fact of the matter is that if we take two physicians, two dentists, or two optometrists of equal professional ability and have one practice within the ten per cent of the families of the upper income bracket and the other within the families of the low income group, the first is apt to be a prosperous practitioner because his patients have the money to pay his high service fees, while the second practitioner of equal ability may be a failure from an economic standpoint because his patients, who come from the low income groups, do not spend much on health service and do not have the money to pay the bills for services that are rendered them.

2. A condition of this kind is unfair to the majority of practitioners in each profession. It is even worse when we consider that a part of the American public have to get along without health service, in time of sickness.

That a condition like this will not be permitted to continue indefinitely can be seen from recent developments, which are of extreme importance. A recent investigation by a committee appointed by President Roosevelt to study the nation's health problem and headed by Miss Josephine Roche, former Assistant Secretary of the Treasury, reports that, "the problem of adequate medical care was not one of inadequate knowledge among medical men or inadequate numbers of physicians, nurses, and dentists, but of inability of about 50 per cent of the people in the United States to pay for medical care." After studying illness rates, hospital care, physician's visits, dental service, and other aspects of the medical situation for three years this group, representing most of the departments of the federal government, reported that one of the outstanding needs of the country is to distribute more equally the facilities and attention now available. "The principal difficulty," the committee said, "is not inadequate knowledge but inadequate funds" because "there are economic barriers between those in need of service and those

prepared and equipped to furnish service." Greater use of preventive and curative health services which modern science has made available depends "on the purchasing power rather than on the need of the community or individual," the report further said. "The effective distribution and utilization of health and medical services demands a national plan for the economic application of our resources in maintaining and improving health."

These statements were interpreted in some quarters as pointing the federal government toward a program of so-called "socialized," "state," or "tax-paid" medicine similar to the present social security program—which, in itself, provides some measure of medical care and research. This belief has been growing for more than three years while dissension has broken out among medical practitioners over the need and advisability of setting up state and national health-aid organizations financed in whole or in part from taxes. The principal break came in November, 1937, when 430 physicians, many of them nationally and internationally famous, defied the American Medical Association by signing and publishing a "medical declaration of independence."

There are many forces at work at the present time demanding that some form of socialized health service be furnished to the public. For instance, the American Federation of Labor, and the C. I. O. with their 8,000,000 members are demanding adequate health service for the public, of a socialized nature. Many women's organizations, and farmer groups, church organizations as well as the unemployed and the underprivileged one-third of the population make similar demands. This is, in itself, the answer to the question of whether or not there is a possibility of a change in the present health system. When organizations with a membership of several millions of people demand a change, some form of socialized health service is apt to be the result. The Gallup poll taken in 1938 indicates that eighty per cent of the physicians believe health insurance inevitable, and seventy per cent actually favor it. This trend toward health insurance and socialized health service by the physicians is not due to liberal or radical thinking but to purely selfish economic reasons, as we shall show later. The actual economic status of the physician is, in the writer's opinion, much better under socialized health service than under private practice. While officially the A.M.A. seems to be against group health insurance, actually the writer believes it to be both *for it* and *against it*, that is, it is sitting on the fence ready to jump either way depending upon developments. In the meantime the writer

understands that several state medical societies are sponsoring voluntary health insurance and forms of socialized medicine.

If we are to have a change in our health service set-up, what system would most benefit both the doctor and the public? There are several systems.

1. Voluntary health insurance. In this system, the patient gets a limited type of health service and the doctor's compensation is equally limited, depending upon the number of patients he gets, the number of treatments he gives, and the number of calls he makes. While this system is an improvement over the present set-up, it does not offer the greatest service for the least cost to the public, nor is it most profitable and practical from the practitioner's standpoint unless he devotes all of his time to this type of service and discontinues his private practice. In that event, the practitioner would be well compensated. An interesting example of this type of service is the Ross-Loos Clinic at Los Angeles, California. For a fee of $30.00 a year, the patient is provided with consultations, home calls, operations, hospital beds, and medicine. A subscriber's wife, child or other dependents who may need medical care pay fifty cents for each office consultation, one dollar for each home call. A minor operation at the clinic costs a dependent $12.50: this includes everything—surgery, hospital bed, nurse, and medicine. A major operation costs $25.00. This system was inaugurated by Dr. Ross and Dr. Loos who opened an office in 1928. It has since grown so that the staff consists of sixty-five physicians, and there are now ten clinics throughout the city. Last year, these clinics cared for 677,313 cases, and performed 2,600 operations. The physicians minimum salary is $3,600 per year. According to a recent University of California survey, this sum is more than the average income of California physicians. The maximum salary at this clinic is $12,000 a year.

2. Cooperative Health Service. This system is similar to the voluntary insurance type with the exception that it is run on a cooperative basis. A good example of this type of service is the Farmers' Union Cooperative Hospital at Elk City, Oklahoma. Here health service is given at the annual cost of $25.00 per family, plus additional small charges for X-Ray, laboratory and surgery service. The Farmers' Union now has 2,500 members, and it owns its own hospital. The salaries of staff physicians range from $6,000 a year upwards. It is interesting to note at this point that although the annual service charge is only

$25.00, yet the income is sufficient to pay physicians a salary higher than the average income of the great majority of physicians in the United States.

3. Compulsory Insurance. This system is just what the term implies. That all of the people of this country would have to pay a definite amount each year for a complete health service to be furnished to them. It can readily be seen that if a cooperative can furnish health service for $25.00 a year for a family, when only 2,500 members participate, under compulsory insurance where all of the people would participate, the cost per family would be still further reduced, and even the practitioners' salaries might be further increased. To the professional man, this plan should be, in the writer's judgment, the most desirable, because his annual income would be greater than it is now from a private practice. As just mentioned the physician's annual income under a limited form of socialized health service in the United States ranges from $3,600 to $12,000, depending upon his efficiency, experience and accomplishment. This is considerably above the average annual income of the great majority of physicians and dentists in this country. This same condition holds equally true in other countries. Let us take England for example. There the expenditure on the limited system of socialized health service is $250,000,000 for physicians and $47,500,000 for dentists. The average annual income of each of the 19,000 panel doctors is about $6,000 and of the dentists $3,750. The annual income of all others connected with health service is about $2,500.

It may be of interest to note at this point that while the British Medical Association at first fought the establishment of socialized health service even on a limited scale, now that it has proven to be successful both from the standpoint of the physician and patient, this same medical association is now urging the government to expand the socialized health service so that more physicians may be placed on the insurance panel and that a greater number of people may be served by these men.

What benefits may we expect from socialized health service? (1) The practitioner will be relieved of his financial worry and will be able to concentrate on his professional duties. (2) The practitioner will not have to spend one-third or more of his time in his office idly waiting for patients, and another third of his time "joining" organizations to make "contacts." (3) The practitioner will be able to devote more of his time to his patients to teach them methods of preventing sickness. (4) The

practitioner will not have to worry about the unpaid bills, twenty per cent of which are never paid under the present system. (5) The public will receive a complete health service, medical, surgical, dental, and optometric at a very reasonable cost. (6) The patient will feel certain that the practitioner has no selfish motive when he advises an operation, a course of orthoptics, or glasses.

Whenever the problem of socialized health service is discussed, its opponents immediately raise the question of finance. They claim that an adequate system of socialized health service would cost at least four billion dollars a year. This burden, they claim, the government can not assume when it already runs up a four billion dollar deficit annually. This would be a very strong argument if the opponents did not overlook the fact that the public today spends, the writer is told, three billion, five hundred million dollars annually for health service which the writer claims is not very satisfactory. It certainly would be wiser to spend one-half billion dollars more each year for what the writer believes to be a more efficient health service. A service which would be available to all people instead of only a part of our population as is the case under the present system. Socialized health service would not mean an additional four billion dollars of additional taxes. It would simply mean a reorganization of the system in the way the public pays its health bill. Instead of hundreds of people facing health bills in excess of their ability to pay, each year the cost would be distributed among all people so that we would all pay a little each year to maintain an efficient health system for the use of all.

The objection is also raised that the public will get inferior service under a socialized health service; the contrary, however, has proven to be the case, the writer believes, where the socialized system has been in operation for some time. An exhaustive study of socialized health srvice has been made by Sir Arthur Newsholme, M.D., former Principal Medical Officer of the Local Government Board of England and Wales, and also by John A. Kingsbury, Secretary of the Milbank Memorial Fund, and by many other authorities, and they conclude that the public gets better service under the socialized health system.

Leading medical men like Dr. M. C. Winternitz, Yale University School of Medicine; W. S. Ladd, Dean of Cornell Medical School; Dr. Thomas Parran, Surgeon General of the United States Public Health Service; Dr. Hugh Cabot, Mayo Clinic; Dr. G. R. Minot, Nobel Prize Winner in 1934; Dr. John P. Peters, Yale University School of Medi-

cine, and several hundred more are openly advocating changes in our national public health system. They call for "a national public health policy directed toward all groups of the population" on the principle that "the health of the people is the direct concern of the government."

The question may now be asked, what does optometry have to do with all of this? My answer is that inasmuch as optometry plays an important role in the health field it should be concerned with the problems and should also be ready to act when these changes in health work are being discussed. You will recall that at the start of this discussion, I stated that optometry can not be considered alone when public health service is considered. Optometry should have its proper place along with medicine, dentistry, nursing, etc. It is important that we decide, soon, upon the stand our profession is to take in regard to socialized health service. It appears to me that the logical thing for us to do despite the recent action of the A.O.A. is to come out *now* for socialized health service, just like the osteopathic profession has done recently. If we do that, we will, in my judgment, stand a much better chance to be included with other professions when a socialized health system is instituted. If we oppose it now, our chances of being included with the other professions will be jeopardized. But you may say, organized medicine is opposing the change, why should we act differently? In reply, we can only point out that medicine can not be left out from any system of socialized health service, while it is possible that optometry could be left out. I believe that the osteopathic profession used good strategy when it endorsed socialized health service and notified President Roosevelt to that effect. The position of osteopathy has been, in the writer's judgment, strengthened considerably. It would be advisable at this time for optometry not only to endorse socialized health service, but to work out plans which will include optometry in any statewide health program. The A.O.A., the state, county and city associations as well as individual optometrists should co-operate with other organizations such as labor groups, women's clubs, farmers associations and church societies to help bring about the establishment of socialized health service.

CORRESPONDENCE

AN ELECTIVE UNDERGRADUATE COURSE IN OCULAR WORK FOR MEDICAL STUDENTS AT MICHIGAN

To the Editor: Your article[1] in the AMERICAN JOURNAL OF OPTOMETRY referable to an elective course in ocular refraction and oph-

[1]Carel C. Koch. The Oculist goes to school. AMERICAN JOURNAL OF OPTOMETRY, Vol. 16, No. 10, pp. 385-386, 1939.

thalmoscopy, has been sent me from the office of our President. I suspect that there has been some misunderstanding in regard to the purpose of this study and what it affords in the way of equipping the young doctor for service in the field of ophthalmology.

I should like to point out that our reasons for offering this elective course are not to make specialists out of our students but to acquaint them in a general way with medicine in all of its broad aspects. We do not attempt to equip students for any type of special service. We teach surgery but our students are not surgeons at the time of graduation. We instruct them in otolaryngology but they are not otolaryngologists when they obtain their diplomas. As a matter of fact our chief endeavor is to make the student realize that he is not here to be taught but that he is in the medical school to learn. It must be impressed upon him that he is an active agent in his own education and that he must know something about a wide range of subjects in order to obtain a broad training.

To conform therefore with medical education in its broadest concepts we make an effort to lay a foundation for the student upon which he may build a superstructure when he engages in postgraduate study. The elective courses only serve to help lay this foundation. May I stress the point therefore that no effort whatsoever is made to train optometrists or ophthalmologists during our undergraduate years. Our students know their limitations. They are men of integrity and none of them have any intention of engaging in some special field without adequate postgraduate training.

DR. A. C. FURSTENBERG, DEAN
MEDICAL SCHOOL
UNIVERSITY OF MICHIGAN
ANN ARBOR, MICHIGAN.

RED AND BLUE FITOVERS FOR HOME TRAINING

To the Editor: I have received a number of letters referring to my article, RED AND BLUE FITOVERS FOR USE BY PATIENTS IN HOME TRAINING, in the November issue of the American Journal of Optometry. The following statement on page 410 seems to be the cause of the difficulty:

> "We took a pair of blue fitover (snap-on) sunglasses and had an optician grind a red glass for one of the eyes. Assuming

patient to be amblyopic in the right eye we inserted the red lens on the left side, the blue lens on the right."

Here is a typical extract from a letter referring to the above statement:

"Please explain why you suggest the red lens on the left eye when the right eye is amblyopic and the blue lens on the eye that is amblyopic. It seems to me that the red lens should be over the amblyopic eye."

Evidently my correspondents have lost sight of the fact that we propose to have the patient do his writing with a yellow or red pencil, not with ORDINARY ink or pencil. Consequently, the eye over which the red lens has been placed will be unable to see any writing. The eye with the blue lens over it will see the writing clearly and distinctly. Since we are trying to stimulate and force the use of the amblyopic eye we place the blue glass over that orb, and the red lens over the good eye so that it will *not* see.

The validity of these statements can of course be easily demonstrated to anyone's complete satisfaction if he will but take the trouble of looking at red writing through a red glass. There are, of course, times when a red light or a red filter is used to stimulate an amblyopic eye but that is a different form of treatment with which this has no connection.

Should there be any further information that anyone wishes on this subject, I will be glad to have them write me.

DR. HARRIS GRUMAN
40 NORTH EIGHTH STREET
LEBANON, PENNA.

INQUIRY AND EXPLANATORY NOTES

Through this department answers to technical questions dealing with orthoptic or refractive problems will be presented. These answers here published have been prepared by competent experts. Inquiries on postal cards and anonymous communications will not be noticed.

UNILATERAL CORNEAL ASTIGMATISM

To the Editor: I am working on a case of unilateral corneal astigmatism in the amount of 1.25 D. Several years ago this eye was struck by a blunt object. There were no lacerations of the cornea at the time of this occurrence. Could the corneal astigmatism, which is present in this eye, have resulted from this minor accident? Corrected vision is normal

H. H., Los Angeles, Calif.

ANSWER: This is very improbable. While it is true that unilateral corneal astigmatism is extremely rare, there is no available evidence which indicates that astigmatism in small amounts results from nonperforating eye injuries. It is quite probable that the astigmatism was present in this eye, prior to the accident.

STATEMENT OF OWNERSHIP

Management and circulation as required by the Act of Congress of August 24, 1912, of the AMERICAN JOURNAL OF OPTOMETRY, published monthly at Minneapolis, Minnesota, for October 1, 1939.

State of Minnesota, County of Hennepin—ss.

Before me a Notary Public in and for the State and County aforesaid, personally appeared Dr. Carel C. Koch, who having been duly sworn according to law, deposes and says that he is Editor and General Manager of the AMERICAN JOURNAL OF OPTOMETRY and that the following is to the best of his knowledge and belief, a true statement of the ownership and management of the aforesaid publication for the date shown in the above caption required by the Act of August 24, 1912, embodied in Section 411, Postal Laws and Regulations, to-wit:

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The American Journal of Optometry.

Sworn and subscribed before me this 18th day of September, 1939.

LILLY L. KOCH, Notary Public,
Hennepin County, Minnesota.

(My commission expires May 19, 1943.)

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